

9 Longview Lake

9.1 General Background

Longview Lake was impounded in 1983, and reached full pool on 23 September 1986. The main threats to water quality in Longview Lake are nutrients, bacterial contamination, sediment / turbidity related to watershed development, and other contaminants related to an urban environment. The lake is listed on Missouri's 303(d) impaired waters list and an approved TMDL developed for mercury related to atmospheric deposition (MDNR 2004).

9.1.1 Location

Historic water quality sample sites at Longview Lake include 3 lake, 1 outflow, and 2 inflow sites (Figure 9.1).

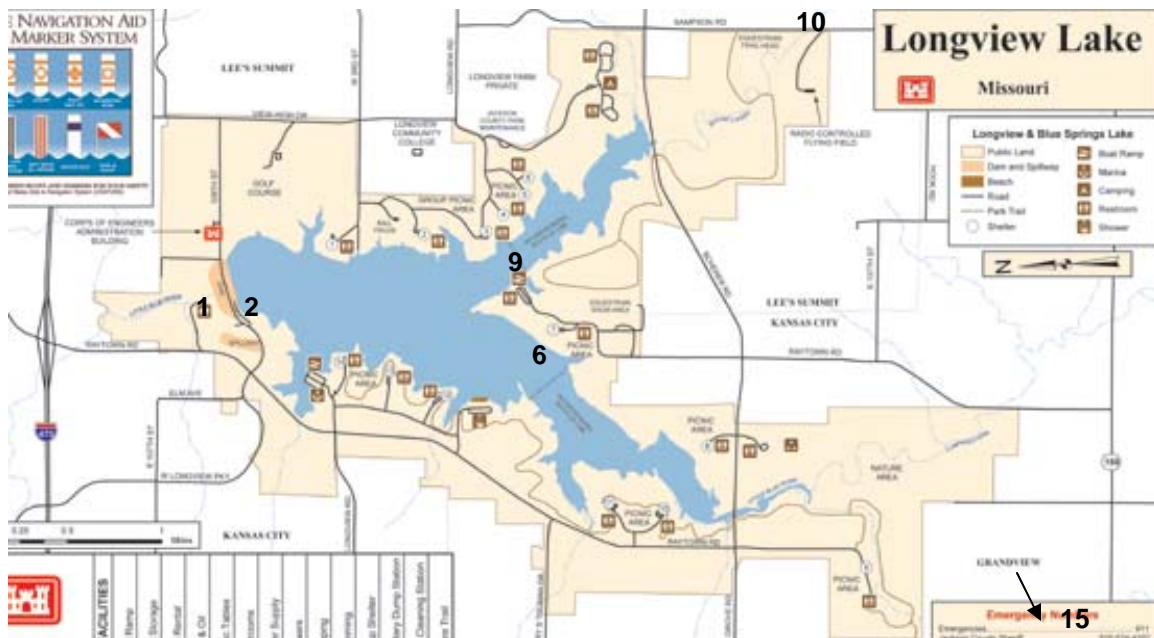


Figure 9.1. Longview Lake area map with sample site locations and site numbers.

9.1.2 Authorized Purposes: Flood control, recreation, fish and wildlife conservation, and water quality improvement.

9.1.3 Lake and Watershed Data

Pools	Surface Elevation (ft. above m.s.l.)	Current Capacity (1000 AF)	Surface Area (A)	Shoreline (miles)
Flood Control	909.0	24.8	1,960	
Multipurpose	891.0	22.1	930	24
Total		46.9		

Total watershed area: 50 sq miles (32,000 A)
Watershed ratio: 16.3 FC / 34.4 MP
Average Annual Inflow: 28,356 acre-feet
Average Annual outflow: 000 acre-feet
Sediment inflow (measured): 20 acre-feet/yr (1948 – 1993)

9.2 2005 Activities

Longview Lake was categorized as an 'ambient' lake during 2005, thus only surface samples were collected at the three lake sites. Samples were collected during May, June and September during 2005. Todd Gemeinhardt (MDC) provided field assistance at Longview Lake during 2005. Fecal bacteria (*E. coli*) samples were collected weekly at the swimming beach from mid-April through September by JCPRD.

9.3 2005 Data

Comparative historic water quality data consists of a single sample collected during June 1999.

9.3.1 Inflow

No inflow samples were collected from Longview Lake during 2005.

9.3.2 Lake

Total nitrogen and chlorophyll *a* concentrations indicate Longview Lake is eutrophic. Median concentrations range from 0.73 – 1.0 mg/L (Figure 9.2), which is above the proposed EPA nutrient criteria value of 0.36 mg/L total nitrogen. Although the median total phosphorus (TP) concentrations (0.03 – 0.06 mg/L) for all sites exceed the proposed EPA nutrient criteria value (0.02 mg/L), Longview has the lowest TP concentration within the district (Figure 9.3). The extensive aquatic vegetation introduction efforts by MDC within the littoral zone of Longview Lake is most likely responsible for the reduced TP concentrations. Once again, these results are from a very limited dataset.

The ratio of TN:TP can be used as a surrogate to determine the dominant algal community within a waterbody. Ratios $\geq 20:1$ are indicative of desirable algal communities, whereas ratios $\leq 12:1$ are indicative of bloom-forming cyanobacteria (blue green algae). Median TN:TP ratios at all three lake sites are > 20 , indicating the lake is at low risk for cyanobacteria blooms (Figure 9.4). This was expected due to low TP concentrations within the lake.

Secchi depth measured during the summer months indicated moderately good water clarity at the tower site (Site 2 = 1.4 m), and slightly lower water clarity in both arms of the lake (0.8 – 1.0 m)(Figure 9.5). Mean chlorophyll *a* concentrations ranged from 12 – 16 ug/L during 2005, with widest variability measured at Site 2 (Figure 9.6).

Vertical profiles were recorded during June, July and September. Parameters included temperature, dissolved oxygen, pH, conductivity, and turbidity. Typical of smaller

eutrophic reservoirs in Missouri, the lake was strongly stratified both chemically and thermally between 3 – 5 m during June and July (Figure 9.7). Lake stratification had deepened to 7-8 m during September in response to cooling air temperatures.

Weekly samples (April – September) of fecal bacteria (*E. coli*) collected during 2004 and 2005 are presented in Figure 9.8. The fecal samples exceeded the state standard for whole-body contact (200 colonies / 100 ml) on 4 occasions during 2005.

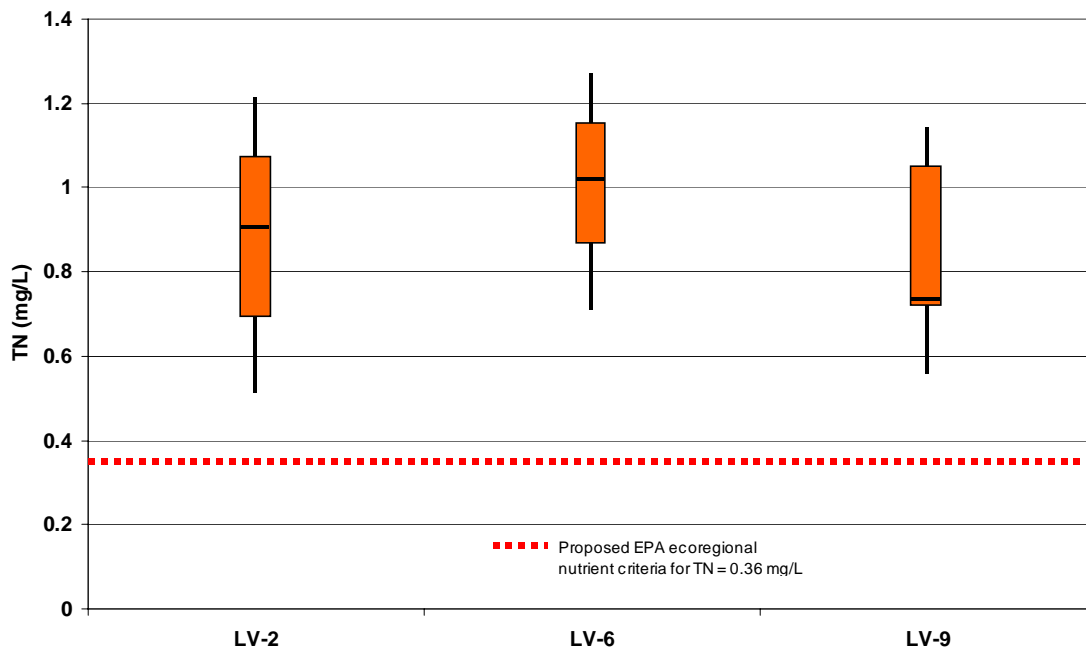


Figure 9.2. Box plots of surface water sample total nitrogen concentrations measured by site during 1999 and 2005 at Longview Lake.

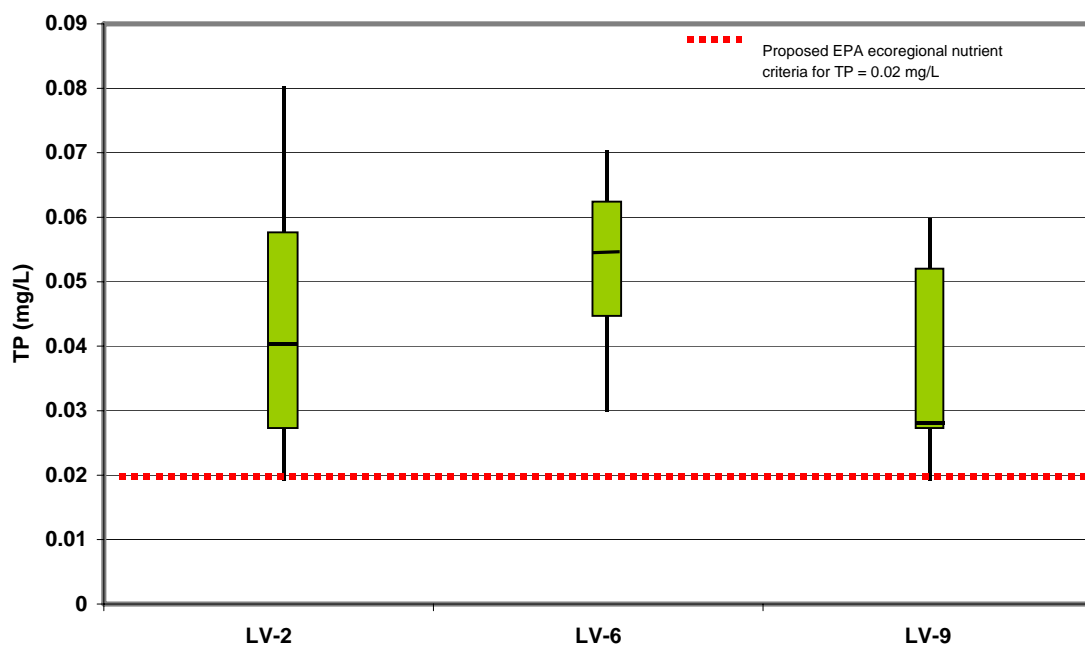


Figure 9.3. Box plots of surface water sample total phosphorus concentrations measured by site during 1999 and 2005 at Longview Lake.

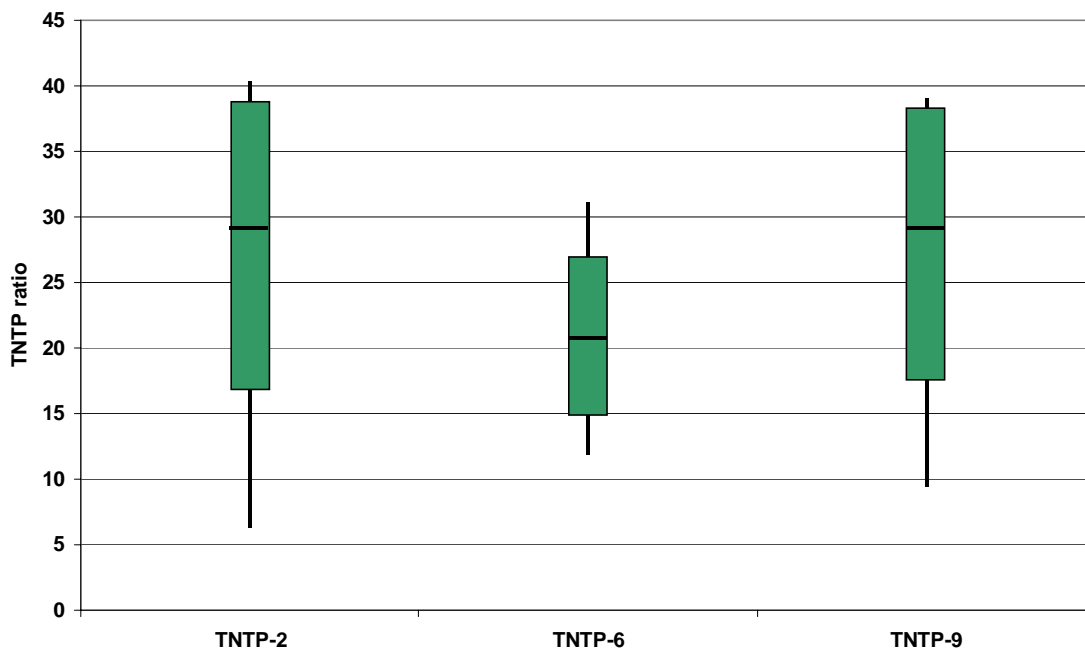


Figure 9.4. Box plots of total nitrogen : total phosphorus (TN : TP) ratios from surface water samples by site from 1999 and 2005 at Longview Lake.

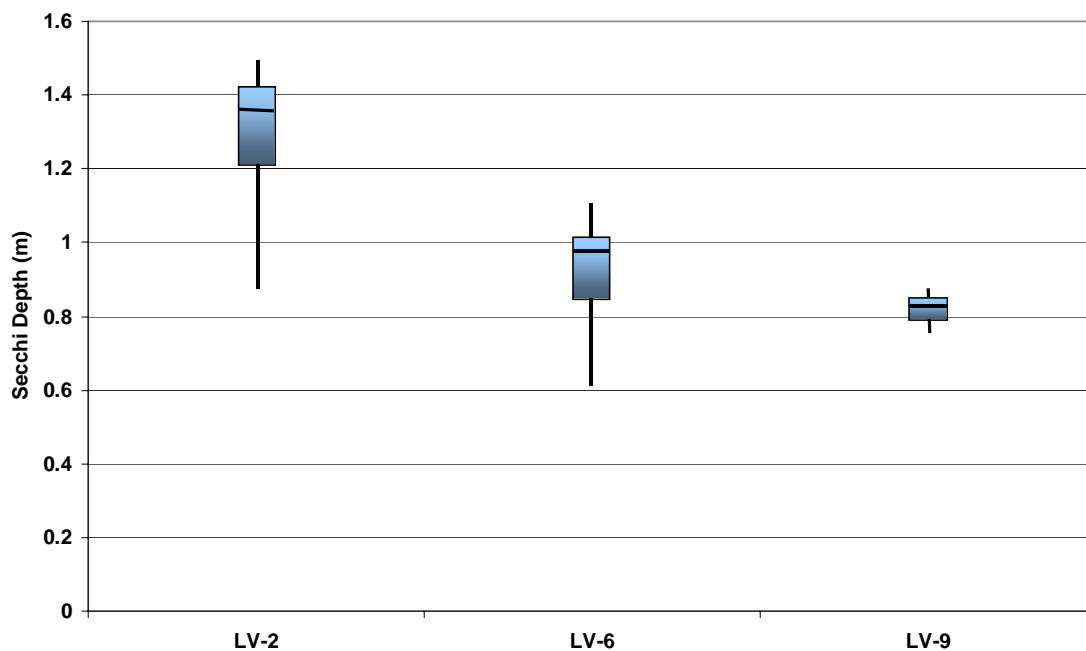


Figure 9.5. Box plots of secchi depth measured at lake sites from 1999 and 2005 at Longview Lake.

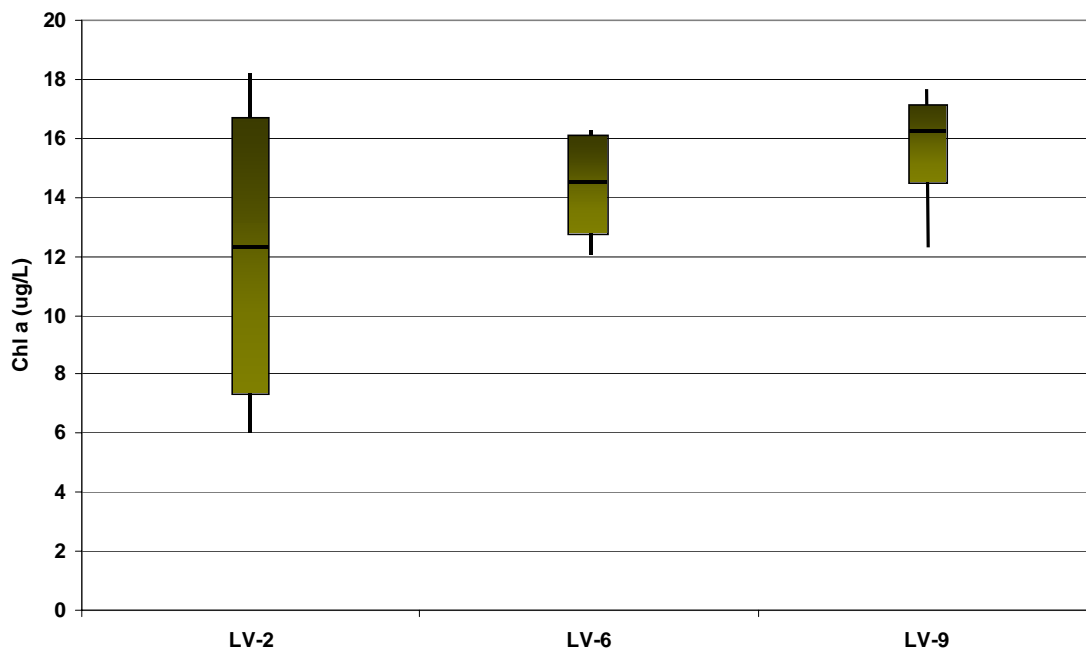
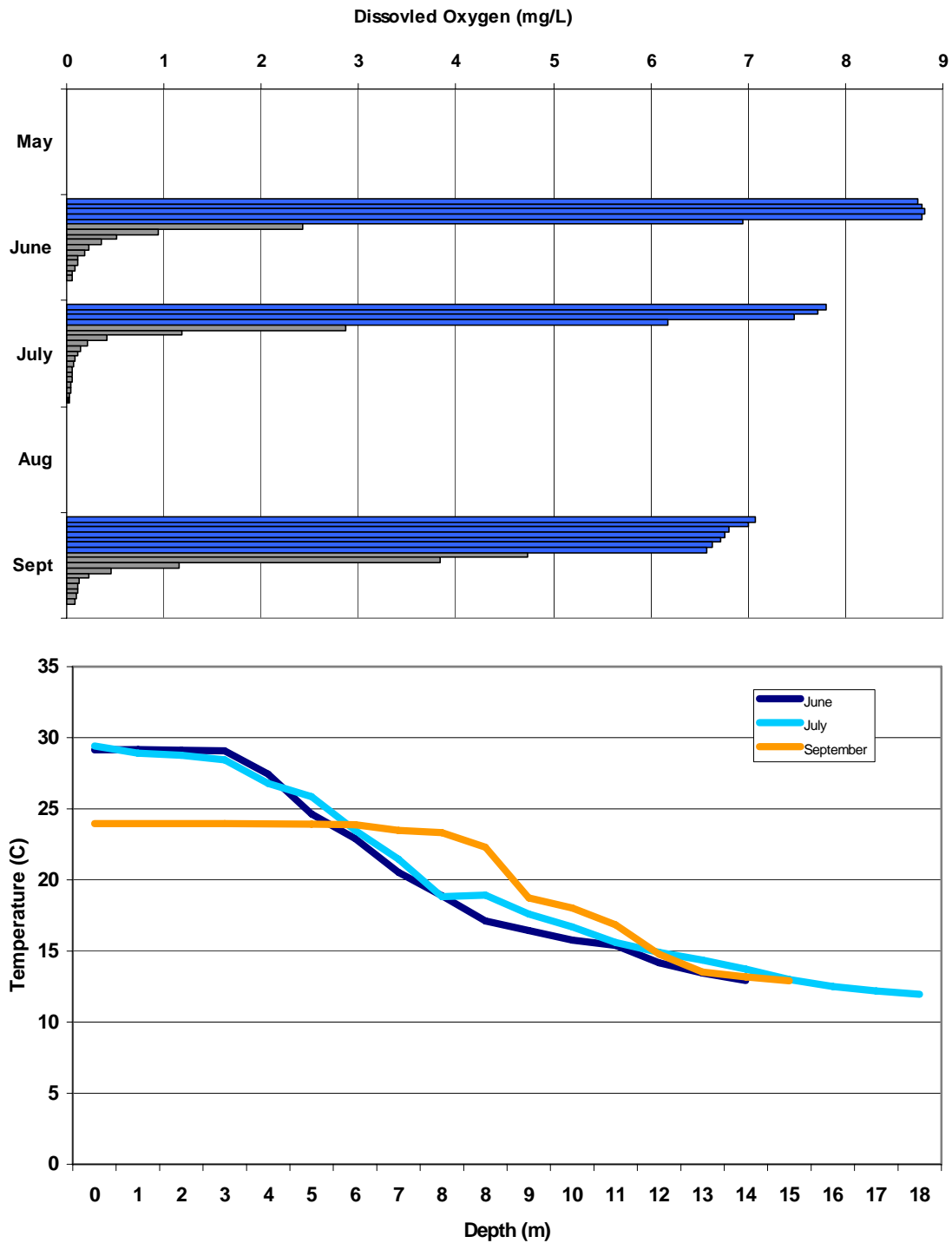


Figure 9.6. Box plots of chlorophyll a concentrations measured at lake sites from 1999 and 2005 at Longview Lake.



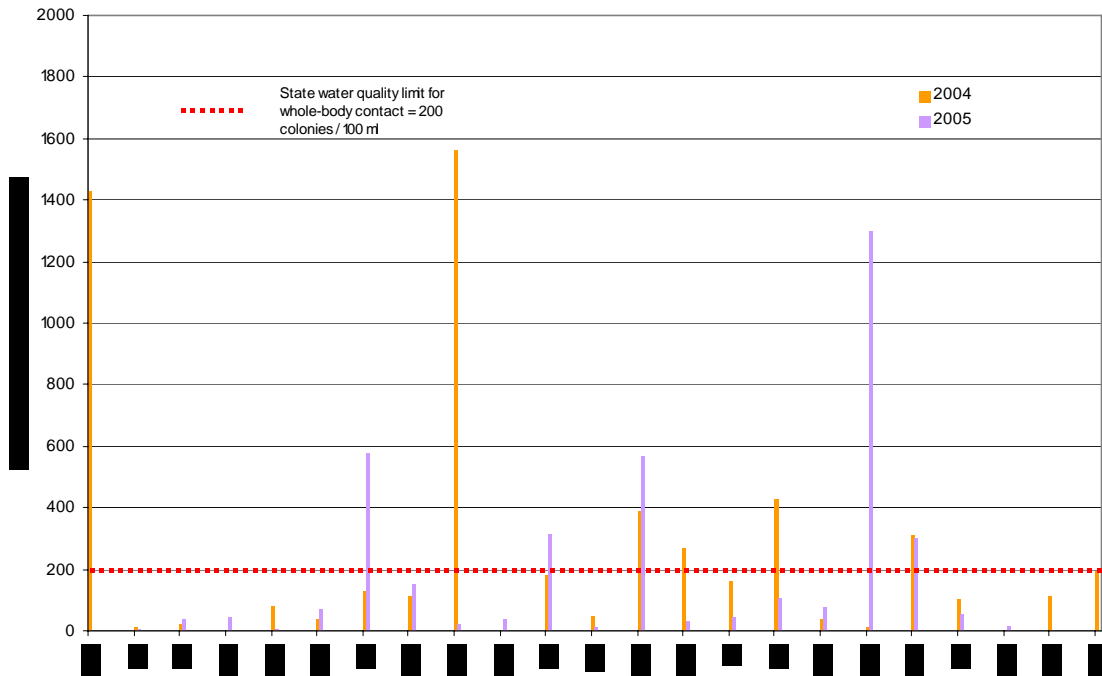


Figure 9.8. Fecal bacteria (*E. coli*) (colonies per 100 ml) swimming beach samples collected from April through September during 2004 and 2005 at Longview Lake.

9.3.3 Outflow

No outflow samples were collected from Longview Lake during 2005.

9.4 Future Activities and Recommendations

Sampling activities for 2006 will include transition to monthly 'intensive' monitoring from April through September, as well as conducting monthly vertical profiles at each of the two lake sites. Fish tissue contaminant analysis is recommended during 2006 or 2007. Sampling will be coordinated with the Missouri Department of Conservation (MDC) and the EPA Region 7 laboratory.